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(54) SEALING MATERIAL FOR LIQUID CRUSTAL DISPLAY CELL, PRODUCTION OF LIQUID CRYSTAL DISPLAY CELL AND LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To surely produce a liquid crystal display panel that a primary adhesion method by a sheet heat press can be applied and high sealing reliability is secured in a high temperature environment.
SOLUTION: The sealing material for a liquid crystal display cell frame is a single-liquid sealing material having the features that the proportion of a high softening point acrylic polymer having ≥50° C softening point is <0.1 wt.%, and that a hardened film having 100□m thickness of the sealing material for a liquid crystal display cell shows <30 g/m2 24 hours of 60° C moisture permeation which represents the amount of water vapor permeating the film in a 60° C and 95 % relative humidity environment for 24 hours.

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CLAIMS

[Claim(s)]
[Claim 1] In the sealant for liquid crystal display cels of 1 acidity or alkalinity, the content of a high softening temperature acrylic polymer 50 degrees C or more Sealant for liquid crystal display cel frames to which 60 degrees C which pass the hardening film which is less than 0.1 % of the weight, and is the thickness of 100 micrometers of the sealant for liquid crystal display cels, and 60-degree-C moisture vapor transmission expressed with the amount of steam transparency for bottom 24 hours of 95% relative humidity environment are characterized by being less than 2-24 hrs(es) of 30 g/m. [softening temperature]
[Claim 2] (1) Epoxy resin which has an average of 2.3 or more epoxy groups in a monad 22 - 84.8 % of the weight, (2) heat — activity latency epoxy curing agent 5 - 25 % of the weight, and (3) Minerals bulking agent Five to 25% of the weight (4) Silane coupling agent 0.1 - 3 % of the weight, and (5) (1) and dissolving solvent 5 - 20 % of the weight, and (6) Wax 0.1 - 5 % of the weight — since — sealant for liquid crystal display cels according to claim 1 characterized by becoming.
[Claim 3] (1) Epoxy resin which has an average of 2.3 or more epoxy groups in a monad 24 - 83.7 % of the weight, (2) heat — activity latency epoxy curing agent 5 - 23 % of the weight, and (3) Minerals bulking agent Five to 15% of the weight (4) Silane coupling agent 0.1 - 3 % of the weight (5) (1) and dissolving solvent 5 - 15 % of the weight, (6) Wax 0.1 - 5 % of the weight (7) Rubbery polymer particle which the mean particle diameter of the primary particle becomes from 5 micrometers or less with the softening temperature temperature of 0 more degree C or less 1 - 10 % of the weight, (8) Hardening accelerator Sealant for liquid crystal display cels according to claim 1 characterized by carrying out 0.1 - 5 % of the weight, or (9) gap appearance, and consisting of 0.1 - 5% of the weight of a control agent. [and]
[Claim 4] (1) Epoxy resin which has an average of 2.3 or more epoxy groups in a monad 24 - 83.6 % of the weight, (2) heat — activity latency epoxy curing agent 5 - 23 % of the weight, and (3) Minerals bulking agent Five to 15% of the weight (4) Silane coupling agent 0.1 - 3 % of the weight (5) (1) and dissolving solvent 5 - 15 % of the weight, (6) Wax 0.1 - 5 % of the weight (7) Rubbery polymer particle which the mean particle diameter of the primary particle becomes from 5 micrometers or less with the softening temperature temperature of 0 degree C or less 1 - 10 % of the weight, (8) Hardening accelerator Sealant for liquid crystal display cels according to claim 1 characterized by carrying out (9) gap appearance and consisting of 0.1 - 2.5% of the weight of a control agent 0.1 to 2.5% of the weight.
[Claim 5] The sealant for liquid crystal display cels according to claim 1 to 4 which said epoxy resin (1) is the mixture of a liquefied epoxy resin and an epoxy resin solid at 0 (1-2)-50 degrees C at 0 (1-1)-50 degrees C, and the weight ratio (1-1): (1-2) is in the range of 1:9-9:1, and is characterized by being a liquid under the range of 0 degree C - 120 degrees C.
[Claim 6] The sealant for liquid crystal display cels according to claim 5 characterized by a solid epoxy resin considering as at least one sort chosen from the group of a cresol novolak mold epoxy resin, a TORIFE Norian methane mold epoxy resin, and a TORIFE Norian ethane mold epoxy resin, or those mixture at the aforementioned (1-1) 0-50 degrees C.
[Claim 7] The sealant for liquid crystal display cels according to claim 2 to 6 characterized by for the rubbery polymer particle of the above (7) being a particle of at least one sort chosen from the group of a silicone rubber particle, an acrylic rubber particle, and a polyolefine rubber particle, or those mixture, and for the softening temperature being -30 degrees C or less, and being that of the range whose mean particle diameter of a primary particle is 0.01-3 micrometers.
[Claim 8] The sealant for liquid crystal display cels according to claim 7 characterized by the rubbery polymer particle of the above (7) being a cross-linking rubber particle.
[Claim 9] The sealant for liquid crystal display cels according to claim 1 to 8 characterized by the aforementioned (5) solvent being at least one sort chosen from the group of an ether solvent and an acetate solvent which has the 150-300-degree C boiling point under 1atm, and has (1) and compatibility, and does not have (3) silane coupling agents and reactivity, or two sorts or more.
[Claim 10] The sealant for liquid crystal display cels according to claim 9 characterized by the aforementioned (5) solvent considering as at least one sort chosen from ethylene glycol monobutyl ether, ethylene glycol monomethyl ether acetate, diethylene-glycol wood ether, propylene glycol monomethyl ether, propylene-glycol-monomethyl-ether acetate, propylene glycol monoethyl ether acetate, and propylene glycol diacetate.
[Claim 11] It is the sealant for liquid crystal display cels of a publication either to claims 1-10 characterized by the

aforementioned (6) wax having the melting point in 60-160 degrees C.
[Claim 12] the aforementioned (6) wax -- carnauba wax, a micro crystallin wax, a denaturation micro crystallin wax, and Fischer -- fatty tuna -- a push wax and denaturation Fischer -- fatty tuna -- the sealant for liquid crystal display cels according to claim 11 characterized by considering as at least one sort chosen from the push wax.
[Claim 13] the aforementioned (2) heat -- the sealant for liquid crystal display cels according to claim 1 to 12 characterized by an activity latency epoxy curing agent considering as at least one sort chosen from the group of a dibasic acid JIBIDORAJIDO compound, an imidazole adduct object, and a polyamine adduct object.
[Claim 14] The sealant for liquid crystal display cels according to claim 1 to 13 which the aforementioned (1) epoxy resin has an epoxy group 2.5 or more weighted means in 1 molecule, and is characterized by the polystyrene conversion number average molecular weight by gel-permeation-chromatography measurement being 7000 or less.
[Claim 15] (3) It is the sealant for liquid crystal display cels of a publication either to claims 1-14 to which the rate of a graft expressed with the weight rate of increase for which the at least 1 section of a minerals bulking agent is a graft object with (1) epoxy resin and/or (4) silane coupling agents, and it asked with the repeat solvent cleaning is characterized by being 1 - 50 weight section per 100 weight sections of (3) by the total of (1) epoxy resin and (4) silane coupling agents which carried out graft association.
[Claim 16] The any or a publication in claims 1-15 sealant for liquid crystal display cels is printed or dispensing applied to the junction seal configuration part of glass or the substrate for liquid crystal cells made from plastics. The manufacture approach of the liquid crystal display cel characterized by carrying out heat-and-pressure bundle processing of the opposite substrate at 110-170 degrees C, and making homogeneous thickness carry out junction immobilization of this opposite substrate in 3-7 micrometers after a pair with another said substrate for un-applying performs alignment after 1 - 20-minute precure at 70-100 degrees C.
[Claim 17] The liquid crystal display component which was obtained by the manufacture approach of the liquid crystal display cel of claim 17, poured in the liquid crystal ingredient into this cel, was made to carry out sealing of the injected hole with 2 liquid type liquid crystal sealant constituent, and was obtained.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the manufacture approach of the sealant for liquid crystal display cels, and its liquid crystal display cel, and a liquid crystal display component.

[Translation done.]

PRIOR ART

[Description of the Prior Art] In recent years, a personal computer is begun and a light weight and a liquid crystal display panel with the thin description came to be widely used as a display panel of various devices. Moreover, while the operating environment is also severe, enlargement, homogeneity, and a high-definition object are desired also for the liquid crystal display cel. By the way, liquid crystal is enclosed between the transparent glass substrate which matched the sealant for liquid crystal display cels with a transparent electrode important as a member which constitutes a liquid crystal display component, or the orientation film suitably, or this plastic plate, and the thermosetting resin constituent used in order to form the cel confined so that it might not leak outside is said. Although the bonded seal nature under an ordinary state, thermal resistance, electric insulation, liquid crystal non-stain resistance, etc. are satisfied enough, since it is general quite low, by the long duration use under this environment, penetration of moisture progresses [the steam gas barrier nature under a harsh environment for example, 60 degrees C - 85 degree-C high-humidity/temperature environment] into a cel with the passage of time, and display nonuniformity, the fall of a speed of response, etc. generate the conventional sealant for liquid crystal display cels of 1 liquid type thermosetting as a result. A sealant for liquid crystal display cels which neither display nonuniformity nor the fall of a speed of response generates whenever [, such as a mounted application, / high-humidity/temperature] in the bottom under the condition which the liquid crystal panel etc. was used and was mentioned above was desired in recent years. By the way, there is remarkable elongation of large-sized liquid crystal display panel product need especially, and recent years are [that a more homogeneous and quality large-sized liquid crystal display panel should be produced] prosperous in reexamination of a heating adhesion process in the production site of the field concerned. Although the multistage heat press adhesion method found it useful from the point of productivity, reexamination of the manufacture approach of a liquid crystal cell is needed from a viewpoint of much more dependability reservation of a panel.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The sealant for liquid crystal display cels which can be manufactured certainly was expected the liquid crystal display panel by which it could respond to the primary gluing method by the sheet heat press, and the high seal dependability in hot-environments-izing was secured under such a situation. In more detail, while enabling a penetration bubble and positive seal adhesion which oozes and does not have generating of ** at the vacuum sheet heat press or the rigid sheet heat press primary-gluing process, even if the steam gas barrier nature under a 60 degrees C - 85 degrees C high-humidity/temperature environment carries out long duration use highly, for example, there is no penetration of the moisture into a cel substantially, and the liquid crystal display cel material which neither display nonuniformity nor the fall of a speed of response generates as a result, and its manufacture approach were desired.

[Translation done.]

English Translation of JP 2001-100223 A

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[Means to solve the Problems]

It was stable for a long term, and a person of present invention found that depression of display unevenness and response velocity did not occur in a condition bottom either by what 60 degrees Celsius water-vapor permeability presented in water vapor permeation quantity for 60 degrees Celsius to pass a hardening membrane of thickness 100μm of sealant for liquid crystal display cells, 95% relative humidity atmosphere bottom 24 hours used the new liquid crystal display cell frame business sealant which was under 30g/m2 / 24hrs as in a high temperature high humidity bottom, and invention became finish. In addition, as the production method, particular epoxide resin, latency epoxy hardener which were heat activity, mineral filler, silane coupling agent, solvent, wax which did the epoxide resin and compatibility, that rubber-like polymer corpuscle, hardening accelerator were provided as necessary more by doing gap soup stock control agent in each specify field and the composition which did were found.

[0005]

In other words the following [a] - [q] is provided.

(a)

In sealant for 1 liquid-related liquid crystal display cells, 60 degrees Celsius water-vapor permeability presented in water vapor permeation quantity for 60 degrees Celsius content 0.1 are under % by weight, and to pass hardening membrane of thickness 100μm of the liquid crystal display cell business sealant of the high flexibility point acrylic polymer that flexibility points are more than 50 degrees Celsius, 95% relative humidity atmosphere bottom 24 hours is the liquid crystal display cell frame business sealant which is under 30g/m2 / 24hrs.

(b)

(1) 22 or more 84.8 epoxide resin % by weight having epoxy function more than an average of 2.3 by the end of monomolecular,

(2) 5-25 heat active latency epoxy curring agent % by weight,

(3) 5-25 inorganic substance filler % by weight,

(4) 0.1-3 silane coupling agent % by weight,

(5) 5-20 solvent % by weight doing (1) and compatibility,

(6) Sealant for liquid crystal display cells as claimed in (a) including a thing comprising 0.1-5 wax % by weight.

(c)

(1) 24 or more 83.7 epoxide resin % by weight having epoxy function more than an average of

2.3 by the end of monomolecular,

(2) 5-23 heat active latency epoxy curring agent % by weight,

(3) 5-15 inorganic substance filler % by weight,

(4) 0.1-3 silane coupling agent % by weight,

(5) 5-15 solvent % by weight doing (1) and compatibility,

(6) 0.1-5 wax % by weight,

(7) Furthermore, flexibility point temperature of less than or equal to 0 degrees Celsius is had, an average particle diameter of the primary particle, 1-10 rubber-like polymer finely divided particle % by weight comprising less than 5μm, and

(8) 0.1-5 hardening accelerator % by weight, or

(9) Sealant for liquid crystal display cells as claimed in (a) including a thing comprising 0.1-5 % by weight of getting out gap control agent.

(d)

(1) 24 or more 83.6 epoxide resin % by weight having epoxy function more than an average of 2.3 by the end of monomolecular,

(2) 5-23 heat active latency epoxy curring agent % by weight,

(3) 5-15 inorganic substance filler % by weight,

(4) 0.1-3 silane coupling agent % by weight,

(5) 5-15 solvent % by weight doing (1) and compatibility,

(6) 0.1-5 wax % by weight,

(7) Flexibility point temperature of less than or equal to 0 degrees Celsius is had, an average particle diameter of the primary particle, 1-10 rubber-like polymer finely divided particle % by weight comprising less than 5μm,

(8) 0.1-2.5 hardening accelerator % by weight,

(9) Sealant for liquid crystal display cells as claimed in (a) including a thing comprising 0.1-2.5 % by weight of getting out gap control agent.

(e)

The epoxide resin (1) is mixture with the epoxide resin which is liquid at 0-50 degrees Celsius (1-1) and the epoxide resin which are solid at 0-50 degrees Celsius (one or two), the weight ratio (1-1) : There is (one or two) in a range of from 1:9 to 9:1, it is (a) sealant including being liquid under a range of 0 degrees Celsius - 120 degrees Celsius for liquid crystal display cells as claimed in any one of - (d).

(f)

At least one kind or those mixture and liquid crystal display cell business sealant as claimed in (e) including what is done which solid epoxide resin is chosen as at (1-1) 0-50 degrees Celsius by cresol Novolak type epoxide resin, triphenol methane pattern epoxide resin, group of triphenol ethane pattern epoxide resin.

(g)

(b) sealant including, at a minimum, it is one kind or corpuscle of those mixture, and the

softening point is lower than -30 degrees Celsius, and an average particle diameter of primary corpuscule being a thing of field of 0.01-3μm which a rubber-like polymer finely divided particle of the (7) is chosen as by a silicone rubber finely divided particle, an acrylic elastomer finely divided particle, group of a polyolefin rubber finely divided particle for liquid crystal display cell as claimed in any one of - (f).

(h)

Liquid crystal display cell business sealant as claimed in (g) including a rubber-like polymer finely divided particle of the (7) being bridging characteristics rubber particle.

(i)

The (5) solvent has the boiling point of 1atm bottom 150-300 degrees Celsius, it is (a) sealant including, at a minimum, being higher than one kind or two kinds chosen by ether solvent (1) and compatibility are had and (3) do not comprise silane coupling agent and reactivity, group of acetate solvent for liquid crystal display cell as claimed in any one of - (h).

(j)

At least one kind and liquid crystal display cell business sealant as claimed in (i) including what is done that the (5) solvent was chosen by ethylene glycol monobutyl ether, ethylene glycol monomethyl ether acetate, diethylene glycol dimethyl ether, propylene glycolmonomethyl ether, propylene glycolmonomethyl ether acetate, propylene glycol thing ethyl ether acetate, propylene glycol diacetate.

(k)

Sealant including the (6) wax having a melt point to 60-160 degrees Celsius (a) in - (j) for liquid crystal display cells as claimed in either.

(l)

At least one kind and liquid crystal display cell business sealant as claimed in (k) including what is done which the (6) wax was chosen as by carnauba wax, microcrystallin wax, property modification my black crystallin wax, Fischer fatty tuna push wax, property modification Fischer fatty tuna push wax.

(m)

At least one kind and (a) sealant including what is done which (2) heat active latency epoxy curring agent was chosen as by two base acid ジヒドラジド chemical agent, glyoxaline adduct body, group of polyamine adduct body for liquid crystal display cell as claimed in any one of - (l).

(n)

(1) epoxide resin 1 has epoxy function more than 2.5 weight average by the end of a molecule, it is (a) sealant including polystyrene conversion number average molecular weight 7000 by the gel permeation chromatography measurement being the following for liquid crystal display cell as claimed in any one of - (m).

(o)

(3) Grafting factor presented in the weight increase factor which it is grafting body with epoxide resin and (4) silane coupling agent (1), and at least one part demanded by the repetition solvent

cleaning method of inorganic substance filler is epoxide resin and sealant including being 1-50 part by weight in a grand total of silane coupling agent (4) which coupled grafting per 100 part by weight of (3) (1) (a) in - (n) for liquid crystal display cell as claimed in either.

(p)

Spence applies sealant for liquid crystal display cells as claimed in either to conjugation seal constitution site of liquid crystal cell use basal plate made by a product made in glass or plastic in (a)- (o) on printing or a day, after having alined in couple with non-swabbing object basal plate of another after プレキュアー at 70-100 degrees Celsius for 1-20 minutes, 熱圧締処理 does the couple basal plate at 110-170 degrees Celsius, it is production method of liquid crystal display cell including conjugation fixing the couple basal plate in homogeneous thickness in the range of 3-7μm.

(q)

It is provided in production method of a liquid crystal display cell of (p), liquid crystal material is poured in the cell, it is the liquid crystal display which sealing can put injection hole 2 in liquid type liquid crystal sealant composition, and was provided.

[0006]

[Mode for carrying out the Invention]

With sealant for liquid crystal display cells of the present invention, content 0.1 of the high softening point acrylic polymer that softening point is more than 50 degrees Celsius in 1 liquid-related liquid crystal display cell business sealant are under % by weight, and 60 degrees Celsius water-vapor permeability presented in water vapor permeation quantity for 60 degrees Celsius to pass hardening membrane of thickness 100μm of the liquid crystal display cell business sealant, 95% relative humidity atmosphere bottom 24 hours is the liquid crystal display cell frame business sealant which is under 30g/m2 / 24hrs. If sealant for liquid crystal display cells of the present invention satisfies the physical properties, it can be produced by both methods, but, for example,

(1) Epoxide resin having epoxy function more than 2.3 weight average by the end of monomolecular,

(2) Heat active latency epoxy curring agent,

(3) Inorganic substance filler,

(4) Silane coupling agent,

(5) Solvent doing (1) and compatibility,

(6) Wax,

(7) Flexibility point temperature of less than or equal to 0 degrees Celsius is had, an average particle diameter of the primary particle, a rubber-like polymer finely divided particle comprising less than 5μm, as necessary

(8) Hardening accelerator,

(9) It can be produced from getting out gap control agent, leveling agent, pigment, dye, plasticizing material, antifoamer, others additive. It is explained from the component concretely.

[0007]

[(1) epoxide resin]

It is preferable more than 2.3 weight average in epoxy function by the end of one molecule, and particularly preferably epoxide resin (1) used for the present invention is lower than 6 more than 2.5 weight average more than 2.4 weight average. If it is such an epoxide resin, which may be used without being concerned with liquid or a solid at room temperature. Because heat resistance of hardening thing can be improved by grinding epoxy function more than 2.3 weight average by the end of one molecule, preferred. In addition, for epoxide resin having epoxy function more than 2.3 weight average by the end of one molecule, the mixture that or two kinds are older than alone of mixture or polyfunctional epoxy resin chosen by monofunction epoxide resin and polyfunctional epoxide resin can be used. Preferably weight ratio (1-1) with epoxide resin (1-1) liquid epoxide resin (1) which is an essential ingredient at 0-50 degrees Celsius and epoxide resin (one or two) solid under 0-50 degrees Celsius: It is 1, 9-9, one mixture composition in (one or two), and it is preferable that the mixture is liquid at 0 degrees Celsius - 120 degrees Celsius, and what is done with at least one kind or those mixture which, as this occurs, (one or two) solid epoxide resin is chosen as at 0-50 degrees Celsius by creosol Novolak pattern epoxide resin, triphenol methane pattern epoxide resin, group of triphenol ethane pattern epoxide resin is particularly desirable. Combined weight ratio with liquid epoxide resin and the epoxide resin which are solid (one or two) in a temperature range of 0-50 degrees Celsius is presented in (one or two) in epoxide resin (1) (1-1) (1-1) in a temperature range of 0-50 degrees Celsius (30:70), what is done with field of - (95:5) is preferable, and it makes like, and being (40:60) is - particularly (80:20). In addition, a thing of less than or equal to 7000 is preferable, and 150-3000 field depends, and polystyrene conversion number average molecular weight demanded for epoxide resin (1) by gel permeation chromatography (it is referred to as merely GPC by the following description) is desirable, and a thing in 350-2000 field is the most desirable. It can do degree of viscosity of sealant for liquid crystal display cells with a preferred range that polystyrene conversion number average molecular weight 7000 by GPC is as follows, because swabbing working properties improves, preferred. In addition, it is high, and bridging density of the hardening body which is provided by assuming polystyrene conversion number average molecular weight 7000 the following can be kept, it improves, and seal reliability is still more desirable. Content of epoxide resin (1) is 22 or more 84.8 % by weight among sealant composition for liquid crystal display cells, and preferably it is 30-70 % by weight.

[0008]

<monofunction epoxide resin>

For example, for monofunction epoxide resin used for the present invention, aliphatic thing glycidy ether compound, aliphatic thing glycidy ether compound, aromatic thing glycidy ether compound, aliphatic thing glycidy ester compound, aromatic thing glycidy ester compound, alicycle formula thing glycidy ester compound, nitrogen chemical element component thing glycidy ether compound, monoglycidy propyl poly siloxane chemical agent, monoglycidy alkane are given. It

goes without saying that monofunction epoxide resin except these may be used.

[0009]

(an aliphatic monoglycidyl ether compound)

By way of example only, aliphatic thing glycidyl ether chemical agent provided in aliphatic thing glycidyl ether chemical agent and aliphatic alcohol provided in reaction with polyalkylene mono alkyl ether having an alkyl group or the alkenyl group which carbon number is shown to with 1-6 integers and epichlorohydrin and reaction with epichlorohydrin is given. For polyalkylene mono alkyl ether having an alkyl group or the alkenyl group which carbon number is shown to with 1-6 integers, ethylene glycol monomethyl ether, diethylene glycol monomethyl ether, triethylene glycol monomethyl ether, poly ethylene glycol monomethyl ether, pyro pyrene glycol thing alkylether, dipyro pyrene glycol thing alkylether, tripyro pyrene glycol thing alkylether, poly pyro pyrene glycol mono alkyl ether are given. For example, n- butanol, isobutanol, n- octanol, two - ethyl hexyl alcohol, dimethylol propane thing alkylether, methylol propane dialkyl ether, glycerin dialkyl ether, dimethylol propane thing alkyl ester, methylol propane dialkyl ester, glycerin dialkyl ester are given for aliphatic alcohol.

[0010]

(an aromatic monoglycidyl ether compound)

By way of example only, aromatic thing glycidyl ether chemical agent provided by aromatic alcohol and reaction with epichlorohydrin is given. For aromatic alcohol applied reaction to, phenol, methylphenol, ethylphenol, n- propyl phenol, isopropylphenol, n- butylphenol, benzyl alcohol, t- butylphenol, xylenol, naphthol are given.

[0011]

(aliphatic or an aromatic monoglycidyl ester compound)

By way of example only, aliphatic thing glycidyl ester chemical agent or aromatic thing glycidyl ester chemical agent provided by aliphatic dicarboxylic acid mono alkyl ester or aromatic dicarboxylic acid mono alkyl ester and reaction with epichlorohydrin is given.

[0012]

<polyfunctional epoxide resin>

For polyfunctional epoxide resin, it is epoxide resin having epoxy function of 2-6 weight average by the end of one normal molecule, but if it is the range that does not obstruct vows by Buddhas in previous lives or worlds to save all sentient beings effect of the invention, warp, and resin having epoxy function older than can be used. For example, aliphatic polyvalence glycidy ether compound, aromatic polyvalence glycidy ether compound, triphenol-type polyvalence glycidy ether compound, hydroquinone type polyvalence glycidy ether compound, resorcinol pattern polyvalence glycidy ether compound, aliphatic polyvalence glycidy ester compound, aromatic polyvalence glycidy ester compound, aliphatic polyvalence glycidyl ether ester compound, aromatic polyvalence glycidyl ether ester compound, alicycle formula polyvalence glycidy ether compound, aliphatic polyvalence glycidy amine compound, aromatic polyvalence glycidy amine compound, hydantoin pattern polyvalence glycidy chemical agent, biphenyl pattern polyvalence glycidy

chemical agent, Novolak pattern polyvalence glycidy ether compound, epoxidation diene polymer are given for polyfunctional epoxide resin. In addition, it goes without saying that even polyfunctional epoxide resin except these can be used.

[0013]

(an aliphatic polyvalence glycidyl ether compound)

By way of example only, aliphatic polyvalence glycidyl ether chemical agent provided by polyalkylene glycol or polyalcohol and reaction with epichlorohydrin is given. For example, for polyalkylene glycol used for reaction, ethylene glycol, diethylene glycol, triethylene glycol, polyethylene glycol, pyro pyrene glycol, dipyro pyrene glycol, tripyro pyrene glycol, poly pyro pyrene glycol are given. Dimethylol propane, trimethylolpropane, spiro glycol, glycerin are nominated for polyalcohol used for reaction.

[0014]

(an aromatic polyvalence glycidyl ether compound)

By way of example only, aromatic polyvalence glycidyl ether chemical agent provided by aromatic diols and reaction with epichlorohydrin is given. For example, bisphenol A, bisphenol S, bisphenol F, bisphenol AD are nominated for aromatic diols used for reaction.

[0015]

(a triphenol-type polyvalence glycidyl ether compound)

By way of example only, triphenol-type polyvalence glycidyl ether chemical agent provided by reaction with triphenols and epichlorohydrin is given. Triphenol methane, triphenol ethane are nominated for triphenols used for reaction.

[0016]

(a hydroquinone type polyvalence glycidyl ether compound)

By way of example only, hydroquinone type polyvalence glycidyl ether chemical agent provided by reaction with hydroquinone and epichlorohydrin is given.

[0017]

(a resorcinol type polyvalence glycidyl ether compound)

By way of example only, resorcinol pattern polyvalence glycidyl ether chemical agent provided by reaction with resorcinol and epichlorohydrin is given.

[0018]

(an aliphatic polyvalence glycidyl ester compound)

By way of example only, aliphatic polyvalence glycidyl ester chemical agent provided by reaction with aliphatic dicarboxylic acid and epichlorohydrin represented in adipic acid is given.

[0019]

(an aromatic polyvalence glycidyl ester compound)

By way of example only, aromatic polyvalence glycidyl ester compounds provided by reaction with aromatic dicarboxylic acid and epichlorohydrin are given. For example, isophthalic acid, terephthalic acid, pyro merit acid are nominated for aromatic dicarboxylic acid used for reaction.

[0020]

(aliphatic or aromatic polyvalence glycidyl ether ester compound)

Aliphatic polyvalence glycidyl ether ester compound or aromatic polyvalence glycidyl ether ester compound provided by reaction with hydroxy dicarboxylic acid compound and epichlorohydrin is given.

[0021]

(an alicycle-type polyvalence glycidyl ether compound)

By way of example only, alicycle represented in dicyclopentadiene type polyvalence glycidyl ether compounds-type polyvalence glycidyl ether compounds are given.

[0022]

(aliphatic polyvalence glycidy amine compound)

By way of example only, aliphatic polyvalence glycidy amine compound provided by reaction with aliphatic diamine and epichlorohydrin represented in polyethylene diamine is given.

[0023]

(aromatic polyvalence glycidy amine compound)

By way of example only, aromatic polyvalence glycidy amine compound provided by reaction with aromatic diamine and epichlorohydrin represented in diaminodiphenyl methane, aniline, meta xylylene diamine is given.

[0024]

(a hydantoin type polyvalence glycidy compound)

By way of example only, hydantoin and hydantoin pattern polyvalence glycidy chemical agent provided by reaction with the derivative and epichlorohydrin are given.

[0025]

(a Novolak type polyvalence glycidyl ether compound)

By way of example only, Novolak pattern polyvalence glycidyl ether chemical agent provided in reaction with novolac resin and epichlorohydrin guided by aromatic alcohol and formic aldehyde represented in phenol, cresol, naphthol is given.

[0026]

(epoxidation diene polymer)

By way of example only, epoxidation polybutadiene, epoxidation polyisoprene are given.

[0027]

[(2) fever active latency epoxy curring agent]

Because latency epoxy hardener (2) which is heat activity to use in sealant composition for liquid crystal display cells of the present invention is the chemical agent which function making begin curing reaction of epoxide resin in a conditions of temperature bottom of higher than 50 degrees Celsius can be applied to, and it does not act as hardener in temperature field to usually handle, is named with the latency epoxy hardener which is heat activity. Heat active latency epoxy curring agent (2) is 5-30 % by weight as rate occupying by the end of sealant for liquid crystal display cells of the present invention. Because it is more than five % by weight, and harden ability of epoxide resin (1) is good, and high liquid crystal display cell business sealant

composition of reliability is provided, what preferred, is done with lower than 30 % by weight again can inhibit remaining of unreacting thing of hardener, and cross-link density of hardening thing and liquid crystal cell seal adhesion reliability can be kept well and are desirable. If heat active potentiality curring agent is acted, it can be used in both, but, for example, addition polymerization things of appendage with appendage with adduct with adduct body with addition polymer of adduct body with complex with 4,4- diaminodiphenylsulphone, dicyandiamide and the derivative, two base acid dihydrazide chemical agent, imidazoles, imidazole compound and aromatic polyvalence carboxylic acid, imidazole compound and epoxide resin or the degeneration derivative, aromatic allyl ether compound, alicycle formula or aromatic diamine and ester, polyamine chemical agent and epoxide resin or the degeneration derivative, amine compound and diisocyanate chemical agent or the degeneration derivative, urea or thiourea and epoxide resin, urea or thiourea chemical agent and diisocyanate chemical agent, a boron trifluoride - amine inferiority complex, vinyl ether block carvone acid compound, aromatic allyl ether compound, N, N- dialkyl ureas, N, N- dialkyl thioureas, melamine, グアナミン, alicycle formula diamine and ester are given. These heat active potentiality epoxy curring agent may use a plural number together alone. It is shown below to that specific example of these compounds.

<2 base acid dihydrazide compound>

(two base acid dihydrazide compounds)

By way of example only, two aromatic base acid dihydrazide, dihydrazide having a valine hydantoin frame represented in adipic acid dihydrazide, sebacic acid dihydrazide, azelaic acid dihydrazide, decanedioic acid dihydrazide, two base acid dihydrazide comprising saturated fatty acid frames presented with an integer of carbon number 6-20 represented in doh decanedioic acid dihydrazide, two base acid dihydrazide comprising unsaturated fatty acid frames presented with an integer of carbon number 6-20 represented in oleic acid dihydrazide, isophthalic acid dihydrazide can be exemplified. A saturated fatty acid frame expressed as a particularly preferred thing with an integer of carbon number 12-20 and / or two base acid dihydrazide comprising unsaturated fatty acid frames or dihydrazide having a valine hydantoin frame are given.

[0028]

<imidazoles>

By way of example only, two - carbinyl iso cyanuric acid additions, two - phenylimidazole iso cyanuric acid additions, 2-n- pentadecyl glyoxaline are given.

[0029]

<imidazole compound and complex> with aromatic polyvalence carboxylic acid

By way of example only, one - cyanoethyl -2 - carbinyl glyoxaline bird Meri Tate or one - cyanoethyl -2 - ethyl -4 - carbinyl glyoxaline bird Meri Tate are nominated.

[0030]

<aromatic allyl ether compound>

By way of example only, allyl ether compound of 1,6- dinaphthol is given.

[0031]

<Alicycle type or aromatic diamine and addition polymerization thing of ester>

0.75-1.2 mol equivalent addition polycondensation could put at least one kind or the mixture chosen by the acrylic acid alkyl ester which had alkyl group presented with an integer of carbon number 1-6 for 1 mol equivalent of alicycle formula diamine or aromatic diamine with addition polymerization thing of alicycle formula diamine and ester to use as heat active potentiality epoxy curring agent of the present invention, group of alkyl methacrylate ester, and it was provided.

[0032]

(alicycle type or aromatic diamine)

There is not limitation in particular as alicycle type or aromatic diamine to apply to addition polycondensation, but, for example, for example, bis (amino cyclohexyl) methane, isophorone diamine, xylylene diamine, 3, 9-2, 4, 8, 10-[5, 5] bis (three-aminopropyl)-tera oxaspiro undecene, bis (aminomethyl) cyclohexane, [2, 2, 1] bis (aminomethyl) bicyclo heptane, cyanoethylation degeneration alicycle formula diamine, epoxy adduct degeneration alicycle formula diamine are given. These use alone, and a plural number is used together, and it may be used.

[0033]

It is shown below to that is preferred, example among these compounds. For screw (amino cyclohexyl) methane, isomer such as 4, 4'-screw (amino cyclohexyl) methane, 2, 4'-screw (amino cyclohexyl) methane, 2, 2'-screw (amino cyclohexyl) methane is preferable. 4, 4'-screw (amino cyclohexyl) methane is particularly preferable for screw (amino cyclohexyl) methane. There is isomer of o-xylylene diamine and m-xylylene diamine and p-xylylene diamine in xylylene diamine, of them, or it may be mixture alone, but particularly preferred m-xylylene diamine. There is isomer of 1, 2-screw (aminomethyl) cyclohexane and 1, 3-screw (aminomethyl) cyclohexane and 1, 4-screw (aminomethyl) cyclohexane in screw (aminomethyl) cyclohexane, of them, or it may be mixture alone, but particularly preferred 1, 3-bis (aminomethyl) cyclohexane. Is alias referred to as norbornane diamine with [2, 2, 1] screw (aminomethyl) bicyclo heptane, there is isomer of 2, 5-[2, 2, 1] bis (aminomethyl) bicyclo heptane (another name, 2, 5-norbornane diamine) and 2, 6-[2, 2, 1] bis (aminomethyl) bicyclo heptane (another name, 2, 6-norbornane diamine), of them, or it may be mixture alone, but preferred what independent, [2, 2, 1] bis (aminomethyl) bicyclo heptane is used as for the order which can improve 耐候性. In addition, alicycle formula diamine derivative such as adduct with adduct body with cyanoethylation property modification alicycle-type diamine, epoxy adduct property modification alicycle type diamine, polyamine chemical agent and epoxide resin, amine compound and diisocyanate chemical agent is desirable, too. Those derivative is explained below in detail.

[0034]

(cyanoethylation property modification alicycle-type diamine)

Cyanoethylation property modification alicycle-type diamine is addition product with alicycle-type diamine and acrylonitrile, and it is usually acrylonitrile less than 2 mol, the product which preferably particularly preferably 0.25-1 mol are added in field of 0.01-1.5 mol,

and was provided for alicycle formula diamine 1 mol equivalent. There is not limitation in particular for alicycle type used for this addition reaction or aromatic diamine, but the usually above-mentioned bis (amino cyclohexyl) methane, isophorone diamine, xylylene diamine, 3, 9- 2, 4, 8, 10- [5, 5] bis (three - aminopropyl) - tera oxaspiro undecene, bis (aminomethyl) cyclohexane, [2, 2, 1] bis (aminomethyl) bicyclo heptane are used.

[0035]

For example, 4, 4'- bis (amino cyclohexyl) methane, cyanoethylation degeneration 2, 4' - bis (amino cyclohexyl) methane, cyanoethylation degeneration2, 2'- bis (amino cyclohexyl) methane, cyanoethylation degeneration cyanoethylation degeneration isophorone diamine, cyanoethylation degeneration o- xylylene diamine, cyanoethylation degeneration m- xylylene diamine, cyanoethylation degeneration p- xylylene diamine, 3, 9- bis (three - aminopropyl) - 2, 4, 8, 10- tera oxaspiro [5, 5] undecene, cyanoethylation degeneration 1, 2- bis (aminomethyl) cyclohexane, cyanoethylation degeneration 1, 3- bis (aminomethyl) cyclohexane, cyanoethylation degeneration 1, 4- cyanoethylation degeneration bis (aminomethyl) cyclohexane, 2, 5- bis (aminomethyl) bicyclo [2, 2, 1] heptane, cyanoethylation degeneration 2, 6- bis (aminomethyl) bicyclo [2, 2, 1] heptane cyanoethylation degeneration are given for the example which is an operative example than a thing of cyanoethylation property modification alicycle-type diamine. [2, 2, 1] cyanoethylation degeneration bis (aminomethyl) bicyclo heptane is given for particularly preferred cyanoethylation property modification alicycle-type diamine. (adduct body with imidazole compound and epoxide resin or the property modification derivative)

If it is adduct body with already well-known imidazole compound and epoxide resin having active hydrogen radical for adduct body with imidazole compound and epoxide resin to apply to the present invention, either can be used. The latency epoxy hardener composition which ratio of molecular of imidazole compound vs. epoxy function of the whole polyvalence epoxy compounds shows softening point temperature of 70-150 degrees Celsius that there is in the range of - (2.2:1) (0.8:1) to than reaction product with phenol novolac resin of the quantity which it is done, and do not go over quantity of 2 times to quantity in weight of polyfunctional epoxy chemical agent and imidazole compound and the polyfunctional epoxy chemical agent which, for example, seem to be disclosed by Japanese Patent Publication No. 52-3828 bulletin for an operative example of property modification derivative of adduct body with imidazole compound and epoxide resin can be exemplified. In addition, epoxide resin and the imidazole compound which seem to be disclosed by Japanese Patent Laid-Open No. 54-123200 bulletin are reacted, mean molecular weight of polystyrene conversion by chemical agent (including imidazole compound) having the nitrogen base which does not have first class amino group by the end of epoxide resin and the molecular that the latency epoxy hardener composition that the latency epoxy hardener composition which, even more particularly, hydroxystyrene resin is reacted, and was provided reacts epoxide resin and the imidazole compound which seem to be disclosed more again by Japanese Patent Laid-Open No. 56-127625 bulletin, and poly alkenylphenol chemical agent is triggered more, and it is seems to be disclosed again by Japanese Patent Laid-Open No. 8-73567 bulletin and GPC can exemplify

latency epoxy hardener composition comprising solid solution with 2000-10000 phenol-formaldehyde resin respectively. It is very desirable that the choice uses the thing that a melt point is 70-150 degrees Celsius as an operative example of property modification derivative of adduct body with imidazole compound and epoxide resin. For adduct body with a polyamine compound and epoxide resin, there is not with a thing limiting in particular (adduct body with a polyamine compound and epoxide resin), but is represented in solid solution substance guided by already well-known polyamine chemical agent and epoxide resin. Latency epoxy hardener of the cold cure characteristics which chemical agent having acidity hydroxy group more than 2 is reacted, and is provided is given more by addition reaction thing with epoxide resin and the polyamine which, in a specific example, for example, seem to be disclosed by 8-12855 Japanese Patent Laid-Open No. bulletins. There are a phenolic plastic, a poly phenolic plastic, polycarboxylic acid for a compound having acid hydroxy group more than two.

[0036]

(adduct with amine compound and a diisocyanate compound or the property modification derivative) For adduct with amine compound and a diisocyanate compound, it is represented in the solid solution substance which well-known the first the second grade - amine compound and diisocyanate are already reacted, and is provided. In addition, for example, the solid solution substance that pyrogenetic reaction can put N which seems to be disclosed by Japanese Patent Laid-Open No. 3-296525 bulletin, N- dialkylaminoalkyl amine and cyclic amine and diisocyanate, and it is can be exemplified for property modification derivative of adduct with amine compound and a diisocyanate compound. In addition, more than flexibility point 60 degrees Celsius that seem to be disclosed by Japanese Patent Laid-Open No. 3-70736 bulletin, the latency epoxy hardener which it makes diisocyanate chemical agent touch a particle surface of pulverulent amine having the third grade amino group uniformly, and is provided can be exemplified. Fuji Kasei Kogyo Corporation article of manufacture / commercial name 'フジキュアー FXR-1000, FXR-1030' are marketed to be concrete, it is a preferred operative example.

[0037]

[(3) inorganic substance filler]

If it is the thing which can be used as normal inorganic filler in inorganic substance filler (3) to use with the present invention, either is preferable. For example, calcium carbonate, magnesium carbonate, barium sulfate, magnesium sulfate, aluminium silicate, a zirconium silicate, jeweler's rouge, titania, aluminium oxide (alumina), zinc oxide, a silica dioxide, potassium titanate, kaolin, talc, asbestos powder, quartz powder, mica, glass fiber are given to be concrete. What the weight average particle diameter value that preferred, the thing that 99 % by weight particle diameter value of pursued 重量加積曲線上 is equal to or less than 5μm is shown to with 50 % by weight value of 重量加積曲線上 again by a laser method particle diameter measuring instrument of 632.8nm wavelength does with field of 0.005-1μm depend and is desirable. When 99 % by weight particle diameter value of 重量加積曲線上 generally uses inorganic substance filler equal to or less than 5μm, dimensional stability of a gap width of liquid crystal panel

improves still more, preferred. It is 5-25 % by weight for a component ratio of inorganic substance filler (3) in sealant for liquid crystal display cells of the present invention. It is less than five % by weight, and a swabbing shape holdout in screen process decorating or dispenser swabbing tends to be inferior. In addition, when it is more than 25 % by weight, flow properties of composition lack, and the reason is because it occurs frequently by refuse Rais in screen process decorating or dispenser becoming shorter. A range of 5-20 % by weight is preferable, and a range of 5-15 % by weight is particularly preferable. In addition, it is preferable for inorganic substance filler (3) to become grafting to epoxide resin (1) and silane coupling agent (6). Grafting may make even one part of inorganic filler (3) grafting entirely. A rate is presented in weight increase factor pursued by solvent cleaning method repeatedly grafting, it is usually desirable per 100 part by weight of mineral filler (3) epoxide resin (1), either of silane coupling agent (6) or that both sides 1-50 are coupled by part by weight grafting.

[0038]

[(5) solvent]

If, for solvent (5) used for the present invention, epoxide resin (1) and compatibility are provided, either can be used. A thing in a range of under 300 degrees Celsius is preferable more than 100 degrees Celsius, and a thing in a range of 160-230 degrees Celsius stops, and the boiling point is desirable. Viscosity stability during the handling is secured by selecting such a boiling point range, and de-solvent is enabled by pre-drying of a short time easily. In addition, it is desirable to be at least one kind or two kinds of above chosen by ether solvent this solvent (5) has epoxide resin (1) and compatibility and (3) do not comprise silane coupling agent and reactivity, group of acetate solvent. There is content in sealant for liquid crystal display cells of the present invention in the range of 5-20 % by weight. For example, ketone solvent as shown in cyclohexanone, ether solvent, acetate solvent make like and can be, and it comes over, and, for a specific example of solvent (5), there is. Ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol thing propyl ether, ethylene glycol monobutyl ether, ethylene glycol monophenyl ether, ethylene glycol dimethylether, ethylene glycol diethyl ether, ethylene glycol dipropyl ether, ethylene glycol dibutyl ether, ethylene glycol diphenyl ether, diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, diethylene glycol thing propyl ether, diethylene glycol monobutyl ether, diethylene glycol monophenyl ether, diethylene glycol dimethyl ether, diethylene glycol diethyl ether, diethylene glycol dipropyl ether, diethylene glycol dibutyl ether, diethylene glycol diphenyl ether are given as a specific example as ether solvent more. In addition, it is preferable as acetate solvent , for example, ethylene glycol monoacetate, ethylene glycol monomethyl ether acetate, ethylene glycol monoethyl ether acetate, ethylene glycol thing propyl ether acetate, ethylene glycol monobutyl ether acetate, ethylene glycol monophenyl ether acetate, ethylene glycol diacetate, diethylene glycol thing methyl acetate, diethylene glycol thing ethyl acetate, diethylene glycol monobutyl ether acetate, diethylene glycol diacetate, equal, it appears, and

is represented. For particularly preferred solvent (5), was chosen by ethylene glycol monobutyl ether, ethylene glycol monomethyl ether acetate, diethylene glycol dimethyl ether, propylene glycolmonomethyl ether, propylene glycolmonomethyl ether acetate, propylene glycol thing ethyl ether acetate, propylene glycol diacetate, what, at a minimum, is done with one kind is preferable.

[0039]

[(6) wax]

As for the sealant composition for liquid crystal display cells of the present invention, 0.1-5 % by weight contains wax (6). Water-vapor permeability of the hardening thing exceeds 30g/m2, 24 hours under 60-85 degrees Celsius, high temperature high humidity atmosphere of higher than relative humidity 95% in composition doing not reach % by weight with wax 0.1 by the end of sealant for liquid crystal display cells, it shows a tendency, durability cannot find rich liquid crystal display cell, the reason is because it shows a tendency, and, in higher than five % by weight, adhesive property with a glass base is obstructed, and seal characteristics are hard to become find for prolonged period, the reason is because it shows a tendency. In addition, it is preferable to assume wax (6) out of sealant for liquid crystal display cells of the present invention 1-3 % by weight. Limitation in particular can use even both crying wax for wax (6). By way of example only, animal system natural wax, plant system natural wax, mineral system natural wax, oil system wax, synthesis hydrocarbon system wax, degeneration wax, hydrogenation wax are given. Wax of less than or equal to 150 degrees Celsius is preferable more than 70 degrees Celsius a melt point in this, particularly preferred carnauba wax, microcrystallin wax, Fischer fatty tuna push wax, property modification Fischer fatty tuna push wax. In addition, it is that is to say desirable for wax (6) among sealant composition for liquid crystal display cells of the present invention that there is as the first corpuscule independent before hardening, and a thing in field of 0.01-5μm is desirable for an average particle diameter of the the first corpuscule, and a thing in field of 0.01-3μm is more desirable. It is shown below to that specific example than a thing (6) of wax.

(animal system natural wax)

By way of example only, bees wax, whale low, shellac low are given.

(plant system natural wax)

By way of example only, carnauba wax, Orry curie wax, kiang Delilah wax, Japan wax, Cane wax are given.

(mineral system natural wax)

By way of example only, Montand wax, ozocerite, ceresin are given.

(oil system wax)

By way of example only, paraffin wax, microcrystallin wax are given.

(complex hydrocarbon system wax)

By way of example only, Fischer fatty tuna push wax and the derivative, a polyethylene wax and the derivative, polypropylene wax and the derivative are given.

(property modification wax)

By way of example only, oxidation wax, Montand wax, acid property modification wax are given.

(hydrogenation wax)

By way of example only, amide wax such as stearic acid amide wax, poly ester wax, opal wax are given.

[0040]

[(7) rubber-like polymer finely divided particles]

Torsina Braid Analyzer (it is referred to as merely TBA as follows.) which it is said to a torsion pendulum method in sealant for liquid crystal display cells of the present invention It is vital for 1-10 % by weight to incorporate rubber-like polymer corpuscle (7) (it can be merely referred to as a rubber-like polymer finely divided particle by the following description.) of less than or equal to 5 μm an average particle diameter of the primary corpuscule which demanded flexibility point temperature of less than or equal to 0 degrees Celsius from hold-out electron microscope observation in the flexibility point temperature which appeared. As for the average particle diameter of a primary particle, 0.01-5 μm are preferable, and 0.05-2 μm are preferable. When a rubber-like polymer finely divided particle (7) to occupy by the end of sealant for liquid crystal display cells does with less than one % by weight, exfoliation phenomena of sealant from object basal plate occurs frequently in pressure cooker test, it shows a tendency. In addition, heat resistance of hardening body falls, and heat creep is done in pressure cooker test, and a gap and gap fluctuation of a cell base are easy to be accompanied with when a rubber-like polymer finely divided particle (7) to occupy by the end of sealant for liquid crystal display cells is done more than ten % by weight, it shows a tendency.

[0041]

It depends to do with 3-8 % by weight in rate holding a rubber-like polymer finely divided particle (7) by the end of sealant for liquid crystal display cells and is particularly desirable. It is thin, and, by what adhesive property depends in what is done if flexibility point temperature of a rubber-like polymer finely divided particle (7) is equal to or less than 0 degrees Celsius, and it improves, and preferred, primary particle diameter of rubber-like polymer corpuscle (7) does with lower than 5 μm again, gap of a liquid crystal cell can be done, use quantity of expensive liquid crystal can be inhibited, and it can improve in liquid crystal display response velocity.

[0042]

Flexibility point temperature of less than or equal to -30 degrees Celsius is had, and, for particularly preferred (7), that the primary particle diameter is silicone rubber corpuscle in the range of 0.01-3 μm and / or acrylic elastomer corpuscle or polyolefin gum corpuscle is given, it is preferable that preferably the (7) is cross-link characteristics gum corpuscule. If, as for these rubber-like polymer finely divided particles (7), flexibility point temperature is equal to or less than 0 degrees Celsius, a well-known rubber-like polymer equal to or less than is already cut by choice use appropriately. By way of example only, a rubber-like polymer having a rubber-like polymer of acrylic elastomer system, a rubber-like polymer of silicone rubber system, a rubber-like polymer of conjugated diene rubber system, an olefin rubber system rubber-like

polymer, a polyester rubber system rubber-like polymer, an urethane rubber system rubber-like polymer, conjugated gum and epoxy function and functional group to respond can be exemplified. As for these rubber-like polymers, epoxy function and a thing having a functional group to respond are particularly preferable. The rubber-like polymer finely divided particle which these use as sealant for liquid crystal display cells may use a plural number together alone. These show below an operative example of a rubber-like polymer finely divided particle (7).

[0043]

Rubber-like polymer finely divided particle> of <acrylic elastomer system

For example, in addition, besides, injection or drip does the acrylic elastomer polymer solution that epoxy function and functional group to respond are introduced, and it is by the end of epoxide resin after correction separately, and, for a specific example of a rubber-like polymer finely divided particle of acrylic elastomer system, acryl system monomer is mixed a method to use the resin composition that it makes do nonaqua dispersion polymerization, and it is as in epoxide resin the method how core region uses the corpuscule that it dries, and is got core / shell pattern emulsion comprising acrylic elastomer as automatically again, there are methods to use the resin composition that de-solvent or grafting makes become, and acrylic elastomer corpuscle is scattered by the end of epoxide resin stably, and it is as.

[0044]

Rubber-like polymer finely divided particle> of <silicone rubber system

After, for example, for a specific example of a rubber-like polymer finely divided particle of silicone rubber system, having reacted a method to use a powdered silicone rubber finely divided particle as, the silicon macromonomer which, in addition, double bond was introduced into epoxide resin, and had the double bond and the single end acrylate radical which could be responded, there is a method to use the resin composition that training dispersion polymerization can put vinyl silicon and high mud Gen silicon, and it is as.

[0045]

<A rubber-like polymer finely divided particle of conjugated diene rubber system>

For example, for a specific example of a rubber-like polymer finely divided particle of conjugated diene rubber system, the conjugated diene rubber-like polymer corpuscle which polymerization or copolymerization does principal monomer such as 1, 3- butadiene, 1, three - pentadiene, isoprene, 1, three - hexadiene, chloroprene, and was provided can be exemplified, it is preferable as an already well-known thing, and there is not limitation particularly. A commercial article may be just used. There is copolymer with butadiene having amino group and acrylonitrile in copolymer with butadiene having carboxyl group and acrylonitrile, end in copolymer with butadiene and acrylonitrile, end for an example of more concrete conjugated diene rubber.

[0046]

<olefin rubber system rubber-like polymer finely divided particle>

For example, for a specific example of an olefin rubber system rubber-like polymer finely divided

particle, ethylene, propylene, one - butene, two - butene, corpuscle comprising copolymer with the other monomer which are amorphous substance polymer or copolymerization possibility alone and terpolymer such as isobutene or the composition can be exemplified. A thing marketed in form such as olefin rubber latex is obtained, it is spin-dried in epoxide resin, and it is processed, a method to use olefin gum as the resin composition that it makes stabilize decentralization by the end of epoxide resin, and it is is preferable example.

[0047]

<polyester rubber system rubber-like polymer finely divided particle>

A polyester rubber system rubber-like polymer finely divided particle is corpuscle comprising the rubber-like polymers that polyester combination is contained by polymer backbone, and there is not limitation particularly. If an example of a concrete polyester rubber is given , for example, the low softening point polyester resin which made, at a minimum, guide from one kind of diol component and low softening point polyester resin or the hydroxy polyvalence carboxylic acid which used acid anhydride as coexistent of polyalcohol chemical agent of higher than triols instead of adipic acid, maleic acid, succinic acid, low softening point polyester resin which, at a minimum, was guided by one kind of two base acid chosen by phthalic acid, two, in addition, base acid as necessary chosen by liquid poly siloxane diol, liquid polyolefin diol, polypropylene glycol, polybutylene glycol can be exemplified.

[0048]

<urethane gum system rubber-like polymer finely divided particle>

An urethane bond and / or an urea bond is corpuscle comprising contained rubber-like polymers to a rubber-like polymer frame with an urethane gum system rubber-like polymer finely divided particle, and there is not limitation particularly. If an example of concrete urethane gum is given , for example, besides, for example, the gummy polyurethane which, at a minimum, a diol component comprising one kind and already well-known diisocyanate chemical agent represented in hexamethylenediisocyanate, isophorone diisocyanate, tolylenediisocyanate, diphenylmethane diisocyanate, norbornane diisocyanate as necessary by coexistent of polyalcohol chemical agent of higher than triols are triggered, and is provided chosen by liquid poly siloxane diol, liquid polyolefin diol, polypropylene glycol, polybutylene glycol can exemplify the gummy polyurethane which, at a minimum, one kind of long chain diamine constituent and already well-known diisocyanate chemical agent represented in hexamethylenediisocyanate, isophorone diisocyanate, tolylenediisocyanate, diphenylmethane diisocyanate, norbornane diisocyanate as necessary by coexistent of polyvalence amine compound of higher than triamine are triggered, and is provided chosen by liquid poly siloxane diamine, liquid polyolefin diamine, polypropylene glycol diamine again.

[0049]

<conjugated rubber particle>

For example, the acryl system, silicon system, conjugate diene system, olefinic system, poly ester, grafted polymers comprising higher than two kinds of urethane system and the corpuscle

that it is from / or block polymer or core shell polymer, bilayer polymer can be exemplified for a conjugated rubber particle.

[0050]

<Epoxy function and a rubber-like polymer having a functional group to respond>

The thing that, for example, epoxy function and functional group to respond are introduced into the acryl system, silicon system, conjugation diene system, olefinic system, poly ester, corpuscule of urethane system for epoxy function and a rubber-like polymer having a functional group to respond, and it is is representative example. In the epoxy function and a rubber-like polymer having a functional group to respond, it is desirable to be 0.1-25 % by weight in the weight rate which configuration coming from monomer having epoxy function and functional group to respond occupies by the end of a rubber-like polymer. Because adhesive property of the liquid crystal display cell business sealant composition which is provided because 25 % by weight does content 0.1 of configuration more than % by weight as follows repeatedly coming from epoxy function and a monomeric substance having a functional group to respond is remarkable, and it improves, preferred. For example, for epoxy function and the functional group which can be responded, sulfhydryl group, amino group, imino group, carboxyl group, acid anhydride groups, epoxy function, hydroxyl group are given. More preferred the thing which 0.01-25 % by weight is desirable for a rubber-like polymer with at least one kind among these functional groups, and is introduced 0.1-10 % by weight into. An introduction method of those functional groups does not have limitation in particular, and even the methods that graft polymerization does to polymer forming random copolymerization method with monomer comprising functional group component monomer and main chain polymer, alternating copolymer method, condensation polymerization method, addition polymerization method, an introduction method by core - shell polymerization method, ion adsorption introduction method, swelling impregnation introduction method, gummy corpuscule method of which is preferable. Because inter-polymerization is done in this, and a graft polymerization method is to do, and arrangement can introduce the functional group that it is necessary into rubber-like polymer corpuscle surface around in little quantity efficiently, preferred. When epoxide resin (1) contains liquid or liquid epoxy in sealant for liquid crystal display cells of the present invention, the thing that rubber-like polymer corpuscle (7) holds configuration as corpuscule by the end of epoxide resin (1) is desirable. And, in sealant for liquid crystal display cells of the present invention, a rubber-like polymer finely divided particle (7) may do grafting with epoxide resin (1) beforehand, grafting needs not to be done.

[0051]

[(8) hardening accelerator]

Sealant composition for liquid crystal display cells of the present invention can incorporate 0.1-5 % by weight of hardening accelerator (8) if necessary. The substance which cold cure characteristics can be applied to by it is used together with latency epoxy curring agent (2) for the hardening accelerator (8), and using is desirable. By way of example only, aromatic amine chemical agent or the salt, polyvalence carboxylic acid or the salt, liquid polyamide,

liquid polyamine amide represented in imidazole compound or the salt, aliphatic amine or the salt, alicyclic amine or the salt, tris dimethylaminomethyl phenol or diazabicyclo undecene represented in 1, 1- 3-p- chlorophenyl dimethylurea, ureas represented in p- phenyl - di (1, 1-dimethylurea), two N- cyanoethyl - carbinyl glyoxaline, two N - cyanoethyl - - ethyl -4 - carbinyl glyoxaline are given. Room temperature activity is low from the inside, and a rich thing is desirable for can stability, and ureas is desirable in this sense.

[0052]

[(9) getting out gap control agent]

If getting out gap control agent (9) of the present invention is the chemical agent that option and accuracy can regulate a gap width of liquid crystal display by width of 3-7μm, and it is such a thing, either can be used. Getting out gap control agent (9) can incorporate 0.1-5 % by weight by the end of sealant composition for liquid crystal display cells if necessary. Preferably it is 0.5-2.5 % by weight. For example, polymer particles of deformation and dissolution, the truth spherical that it is not swelled, form of soccer ball corpuscule, mineral corpuscule of top and bottom right and left object such as stick fiber or thermosetting property are given for getting out gap control agent (9) by epoxide resin (1) or solvent (10) to use if necessary. For an example of an inorganic substance particle of getting out gap control agent (9), truth ball silica particle, truth ball alumina particle, a glass staple fiber, metal staple fiber, metal powder are given. For example, polymer particles of deformation and dissolution, the truth spherical that it is not swelled, form of soccer ball corpuscule, mineral corpuscule of top and bottom right and left object such as stick fiber or thermosetting property are given for getting out gap control agent (9) by epoxide resin (1) or solvent (10) to use if necessary. For an example of an inorganic substance particle of getting out gap control agent (9), truth ball silica particle, truth ball alumina particle, a glass staple fiber, metal staple fiber, metal powder are given. For polymer particles of thermosetting property, a polystyrene truth spherical particle and others of thermosetting property, a phenol resin system heat curing particle, benzoguanamine resin system heat curing corpuscule are given. An inorganic substance particle is a particularly preferred example in what it is highly precise, and can control gap degree of precision.

[0053]

[others additive]

As necessary, furthermore, leveling agent, pigment, dye, plasticizing material, use of antifoamer are possible.

[0054]

[an adjustment method of sealant composition for liquid crystal display cells]

Adjustment of sealant composition for liquid crystal display cells of the present invention, (1)

Epoxide resin having epoxy function more than an average of 2.3 by the end of monomolecular, (2)

Heat active latency epoxy curring agent,

(3)

Inorganic substance filler,

(4)

Silane coupling agent,

(5)

Solvent doing (1) and compatibility,

(6)

Wax,

(7)

Flexibility point temperature of less than or equal to 0 degrees Celsius is had, an average particle diameter of the primary particle, a rubber-like polymer finely divided particle comprising less than 5μm, as necessary

(8)

Hardening accelerator,

(9)

Getting out gap control agent, leveling agent, pigment, dye, plasticizing material, antifoamer, others additive are added appropriately, it should be mixed, and there is not restriction particularly. In addition, sealant composition for liquid crystal display cells of the present invention contains solvent doing epoxide resin (1) and compatibility, under weight may contain high softening point acrylic polymer 0.1 that, for this case, softening point is more than 50 degrees Celsius.

[0055]

(the high flexibility point acrylic polymer that flexibility points are more than 50 degrees Celsius)

The high flexibility point acrylic polymer that flexibility points are more than 50 degrees Celsius is acrylic polymer having softening point temperature of higher than 50 degrees Celsius in flexibility point temperature pursued from TBA. Polymethyl methacrylate resin and vinyl chloride resin and a high flexibility point polymer represented by polystyrene are given to be concrete.

[0056]

[physical properties of sealant composition for liquid crystal display cells]

There is not limitation for degree of viscosity before hardening of sealant composition for liquid crystal display cells particularly, but field of 1 - 1000Pa / s is desirable, and field of 5 - 500Pa / s depends, and 25 degrees Celsius viscosity by B pattern viscometer is desirable, and field of 10 - 200Pa / s is the most desirable. Sealant composition for liquid crystal display cells of the present invention may prepare to show viscosity characteristics of the field by methods such as heat good self-care beforehand.

[0057]

In addition, in チクソ index expressed in ratio (10rpm degree of viscosity value /1rpm degree of viscosity value) of 10rpm viscosity value and 1rpm viscosity value demanded a rotary bob number of B type viscometer from by equivalence and 10 rounds per minute a minute ズリ velocity doing at the age of 1 round per minute re-velocity, there is not limitation particularly, but it is preferable that preferably there is in the range of 1-3.

[0058]

[production method of a liquid crystal display cell]

With production method of a liquid crystal display cell of the present invention, Spence applies sealant for liquid crystal display cells of the present invention to conjugation seal constitution site of liquid crystal cell business basal plate of a product made in product made in glass or plastic on printing or a day, after having alined in couple with non-swabbing object basal plate of another after プレキュアー at 70-100 degrees Celsius for 1-20 minutes, 熱圧締処理 does the couple basal plate at 110-170 degrees Celsius, it is production method of liquid crystal display cell including conjugation fixing the couple basal plate in homogeneous thickness in the range of 3-7μm. On that occasion プレキュアー is necessary beforehand when sealant for liquid crystal display cells solvent (5) is contained, and to become is completely rigidified, and an adhesive seal is done. A プレキュアー condition does not have limitation in particular, but it is vital to select baking temperature of less than or equal to heat activity temperature of the latency epoxy hardener it is possible for de-solvent and, at a minimum, 95 % by weight contains for 100 by a solvent minute to contain. Temperature is 5-60 minutes as a range of 60 degrees Celsius - 120 degrees Celsius, drying time for a general プレキュアー condition. It is preferable to make drying for a short time so as to become high temperature. It is プレキュアー beyond 120 degrees Celsius, and de-solvent is possible, but degree of precision of a gap width tends to fall in progression of curing reaction, and attention is necessary. For example, a glass substrate, a plastic substrate are nominated for basal plate for used liquid crystal cells. So-called liquid crystal cell constitution business glass base or the plastic base that it is executed the work in a group of basal plate by part needing oriented film others mineral ion masking membrane represented in transference electrode or polyimide represented in indium oxide as a matter of course, and it is is used. A method to apply sealant for liquid crystal display cells to basal plate does not have limitation in particular, and, for example, it may be performed by a screen process decorating application method or a dispenser application method. In addition, as necessary pre-swabbing afterward, it makes it dries, and compete for the back, it is bonded by a 加熱圧締接着 method to seal, but it is not limited for heat conditions of cure in the case particularly, but it is preferable as 24 or more 0.5 time with about 110-170 degrees Celsius. In addition, there is not the condition which can find temporary adhesive property with a thing limiting particularly when 熱圧締 / an adhesion bond process is performed with blade leaf fever press, but preferably open takes out pressure after dimension conjugation at 110-180 degrees Celsius for 2-10 minutes, pass, and may be produced cure processes in two steps or plural heat processes to make recuperate from complete hardening in the heat ovens which it is followed,

and was adjusted to a temperature bottom. Here, heat press of the specifications that by one set of blade joins is meant with blade leaf fever press, vacuum blade leaf heat presses the blade leaf heat press equipment which can add heat to vacuo, rigid body blade leaf heat breath of the type that hot plate is gone through under or atmospheric pressure, and 加熱圧締接着 does forcibly is known. It may be both blade leaves fever press method. In addition, even if it is to do 熱圧締 / adhesion bond process with multistage heat press separately from blade leaf fever press, it does not have any problem at all.

[0059]

[liquid crystal display]

In addition, with liquid crystal display of the present invention, Spence applies sealant for liquid crystal display cells of the present invention to conjugation seal constitution site of liquid crystal cell business basal plate made by a product made in glass or plastic on printing or a day, after having alined in couple with non-swabbing object basal plate of another after プレキュアー at 70-100 degrees Celsius for 1-20 minutes, 熱圧締処理 does the couple basal plate at 110-170 degrees Celsius, because conjugation fixes the couple basal plate in homogeneous thickness in the range of 3-7μm, it is provided, liquid crystal material is poured in the cell, it is the liquid crystal display which sealing can put impregnation hole 2 in fluid pattern liquid crystal sealant composition, and was provided. It is already preferable using a well-known thing for 2 liquid type liquid crystal sealant composition, and there is not restriction particularly. By way of example only, two fluid pattern liquid crystal sealant composition that it is from two fluid liquid crystal sealant composition comprising epoxide resin and 2 liquid type liquid crystal sealant composition comprising polyamide curring agent, epoxide resin and polythiol hardener, epoxide resin and polyamine hardener can be exemplified. Liquid crystal material does not have limitation either, and, for example, nematic liquid crystal or ferroelectric liquid crystal are preferred. For example, for liquid crystal display provided in the present invention, ferroelectric pattern liquid crystal element proposed by liquid crystal element of liquid crystal element of TN type which エムシャツト (MSchadt) and ダブリユヘルフリッヒ (WHelfrich) proposed (Twisted Nematic) or STN pattern (Super Twisted Nematic) or clarke (NAClark) and lah moth well (STLagerwall), the liquid crystal display which provided each pixel with a film transistor (TFT) again are given as preferred example.

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EXAMPLE

[Example] Although the below typical example explained this invention to the detail, it was not limited to this. % of a publication among an example and the section mean weight % and the weight section, respectively. Moreover, the raw-material kind (abridged notation) used among the example is as follows.
[0061] The sealant constituent 100 section for [test-method] (storage stability trial) liquid crystal display cels is put into the container made from polyethylene, and is sealed, and the back, 20-degree-C viscosity value at the time of seal is set to 100, and will be expressed with the rate of the said viscosity value change after progress for -10 degrees C / 30 days. Notation x indicated in the example the case where there was change to which storage stability exceeds 50% by notation ** in the sense of a problem a little about the case where storage stability was notation O in good semantics when it was less than 10% of rate of change, and it is 11 - 50% of rate of change, in the sense of poor storage stability.
[0062] (Workability trial with **) The sealant constituent for liquid crystal display cels by which seal preservation was carried out was taken out in the container made from polyethylene below the freezing point, and it returned to the room temperature of 25 degrees C over 2 hours. Notation x indicated in the example the case where there was change which is notation ** noting that workability with ** is a little missing in the case where it was notation O and is 16 - 50% of rate of change, and exceeds 50%, in remarkably missing [activity fitness with **]-semantics, the viscosity rate of change after 12-hour neglect having expressed at 25 degrees C, and having used [set 25 degree-C viscosity value at the time to 100, and] the case where it was less than 15% of rate of change as the workability with ** being good.
[0063] (Moisture-vapor-transmission property) The sealant constituent for liquid crystal display cels of each example It applied by 70-150micro thickness in thickness on the smooth mold releasing film, the hardening film which was stiffened for 90 minutes and obtained at 150 degrees C was cut down, the water vapor permeability test according to moisture-vapor-transmission test-method (cylinder plate method) JIS-Z-0208 of the moistureproof packaging material of Japanese Industrial Standards (JIS) was carried out, and the water vapor content per [which carried out moisture permeation in 24 60-degree-C o'clock hours] 100micro of thickness (unit; g/m2 and 24hrs) was calculated. Consequently, it is notation O about the case where a moisture-vapor-transmission property is less than 2-24 hrs(es) of 30 g/m, and notation x indicated the case where a moisture-vapor-transmission property exceeded 51g/m2 and 24hrs. Moreover, a moisture-vapor-transmission property is 50 or less [30 or more to]. The case where they were g/m2 and 24hrs was displayed into the example by notation **.
[0064] (Junction seal trial) The cel for liquid crystal displays manufactured through the sheet press hardening process under the conditions shown in each example was observed through the magnifier with the naked eye, and the existence [line / seal] of turbulence and the existence of the seal fault by generating of a penetration bubble were measured.
[0065] (Heat-resistant wedge ****** of a cel examines by carrying out) A wedge is driven into the cel for liquid crystal displays manufactured through the sheet press hardening process under the conditions shown in each example under 60-degree-C environment, and the adhesive strength of the sealant constituent for liquid crystal display cels is expressed with the desquamative state at that time. Consequently, the heat-resistant adhesive property was notation O in good semantics, and the case where are notation O in the semantics which is excellent in a heat-resistant adhesive property when it is destruction of a substrate, and it was accompanied by a part of cohesive failure of the sealant constituent for liquid crystal display cels was displayed into the example by notation x noting that the problem was in heat-resistant adhesive strength, when the destruction accompanied by interfacial peeling was accepted.
[0066] (Non-blot broth nature of the sealant constituent for liquid crystal display cels) The sheet press hardening process under the conditions shown in each example pass -- the enclosure opening after the threshold electrical potential difference of liquid crystal encloses RC4087 [Chisso Corp.] liquid crystal ingredient 1.38 volts and whose deltaepsilon of liquid crystal are 12.4 from liquid crystal enclosure opening with a vaccum method to the manufactured cel for liquid crystal displays -- SUTORAKUTO bond ES- it obturated by 302 [the Mitsui Chemicals, Inc. make], the deflecting plate was stuck on the front-side, and the deflecting plate with a reflecting plate was further attached in the rear-side. Then, the drive circuit etc. was made to mount in this unit, and the liquid crystal panel was produced. The liquid crystal display function near the sealant of the liquid crystal panel performed the evaluation judging of non-blot ****** by whether it functions normally from the early stages of a drive. This judgment approach is notation O noting that non-blot ****** is secured in the case where even the seal time can demonstrate the liquid crystal display function, It was notation ** noting that non-blot ****** was a little missing in

the case where a liquid crystal display is not carried out normally [near in the seal case] less than 1mm, and the case where the abnormalities of a display function were seen across 1.1mm of near in the seal case was displayed as notation x noting that non-blot ****** was remarkably missing.

[0067] (Seal functional durability test) pass the sheet press hardening process under the conditions shown in each example -- the manufactured cel for liquid crystal displays -- receiving -- liquid crystal enclosure opening to RC4087 [Chisso Corp.] liquid crystal -- pouring in -- the enclosure opening -- SUTORAKUTO bond ES- it obturated by 302 [the Mitsui Chemicals, Inc. make], and the liquid crystal panel was produced. the liquid crystal panel -- the bottom of 85 degrees C / RH90% of ambient atmosphere -- 250 hours and these 500 hours -- said -- it took out after neglect for 1,000 hours, respectively, the deflecting plate was stuck on the front-side, and the deflecting plate with a reflecting plate was further attached in the rear-side, respectively. Then, the drive circuit etc. was made to mount in this unit, and change of a display function was observed. Consequently, the case where display nonuniformity amounted to 500micro or more at the seal time, and the fall of a display function has generated remarkably the case where display nonuniformity is slightly seen within 500 micrometers in the distance of a from in the seal case of a cel periphery by notation O in the case where generating of display nonuniformity is not seen, in notation O is displayed into an example by notation x, respectively.

[0068] [Use raw material] etc. 1. Epoxy resin (1)

As a monofunctional nature epoxy resin, selection use of 2-ethylhexyl monoglycidyl ether (abridged notation; 2EHG) (reagent) and the t-butylphenol monoglycidyl ether (abridged notation; t-BPMG) (reagent) was carried out. The following were represented as a multiple-valued epoxy resin of two or more functionality. As a 2 functionality aliphatic series epoxy resin, it is reagent;1 and 6-hexanediol diglycidyl ether as a 2 functionality bisphenol A mold epoxy resin, The Mitsui Chemicals product and a trade name "EPO MIKKU R-140P" (average molecular weight 370), An oil-ized shell product and a trade name "Epicoat 1001" (average molecular weight 900), a **** trade name "Epicoat 1004" (mean molecular weight 1400) -- moreover, as a 2 functionality bisphenol female mold epoxy resin As a 2 functionality hydrogenation bisphenol A mold epoxy resin, selection use of the Tohto Kasei product and the trade name "EPO TOTO ST-1000" (mean molecular weights 400-440) was carried out for the Dainippon Ink product and the trade name "Epiclon 830-S" (mean molecular weight about 350-370). If considered as 3 functionality epoxy resin, as a novolak epoxy resin, in the TORIFE Norian ethane mold epoxy resin, the Mitsui Chemicals, Inc. product "EPO MIKKU VG 3101" was carried out, and selection use of the oil-ized shell company product "Epicoat TMH574" was carried out for the Tohto Kasei product and the trade name "EPO TOTO YDCN" (molecular weight about 870-1000) with the TORIFE Norian methane mold epoxy resin. As a 4 functionality amino epoxy resin, selection use of the Tohto Kasei product and the trade name "EPO TOTO YH-434" (average molecular weight 460 [about]) was carried out.

[0069] 2. Minerals bulking agent (3)

As a non-fixed form silica 1, they are a Japanese Aerosil industrial product and a trade name "Aerosil #200" (electron microscope observational method). ********** (**********|**********<=> ********** according to ** ** ** ********** ** ******** ** ********** ** iota), **********^** It **. **********|**********<=>********** -- ********** I ******** purification-by-ablution **********classified by ********** ** ********** according to iota ** iota ** -- ********** **** (********** ********** doormat)

[0070] Moreover, the following were used as a graft-ized denaturation alumina. With the graft-ized denaturation alumina, 0.1 micrometers and the non-fixed form gamma-alumina whose 99% particle diameter is 2 micrometers were prepared with 50% mean particle diameter for which it asked from the weight **** curve for which it asked with the laser radiation type particle-size-distribution measuring method of 632.8nm wavelength. And carry out spraying processing under 100-degree-C ambient atmosphere at a rate of 30.3g of gamma-glycidyl propyltrimethoxysilane (the Shin-etsu chemical and a trade name KBM 403), and it is made to grout--ization-ripe at 80 more degrees C to 1kg of the non-fixed form gamma-alumina for 48 hours, obtains, and is only called a graft-ized denaturation alumina in an example. In addition, since 1.7% of heating loss occurred burning the dried sample for the ten sections of a graft-ized denaturation alumina in a crucible also in the dried sample after five washing in the toluene solvent 100 section as a part for organic, it became clear that about 2.4% had graft-ized as a gamma-glycidoxy propyl TORIMECHIKISHI silane.

[0071] 3. Coupling Agent (4)

gamma-glycidyl propyltrimethoxysilane (the Shin-etsu chemical and a trade name KBM 403) or isocyanate propyl triethoxysilane (the Nippon Unicar product and trade name Y-9030) was used for the coupling agent (4).

[0072] 4. -- the latency epoxy curing agent (2) of a dibasic-acid dihydrazide system -- adipic-acid JIHIDORAJIDDO (product made from the Otsuka chemistry) [cable address;ADH] -- moreover -- an imidazole-epoxy adduct mold latency epoxy curing agent (2) -- the Mitsui Chemicals product and a trade name -- "Cat-Z -15" [cable address;AD2], or the Ajinomoto product and a trade name "friend KYUA PN-40J" was used.

[0073] (Synthetic example 1) While adding 600g [of bisphenol female mold epoxy resins] (Epiclon 830S and Dainippon Ink & Chemicals, Inc. make), 12g [of acrylic acids], and dimethylethanolamine 1g, and toluene 50g as an epoxy resin of two functionality and introducing air into the 2000ml 4 opening flask equipped with the synthetic agitator of a rubbery polymer particle (fine bridge formation mold acrylic rubber particle; S1 and abbreviated name) content epoxy resin constituent (a), gas installation tubing, the thermometer, and the cooling pipe It was made to

react at 110 degrees C for 5 hours, and the double bond was introduced. Next, adding butyl acrylate 350g, glycidyl methacrylate 20g, divinylbenzene 1g, azobis dimethylvaleronitrile 1g, and azobisisobutyronitril 2g, and introducing nitrogen in the system of reaction, it was made to react at 70 degrees C for 3 hours, and was made to react at 90 more degrees C for 1 hour. Subsequently, detoluene was performed under reduced pressure of 110 degrees C, and the fine bridge formation mold acrylic rubber particle (S1) whose mean particle diameter obtained by the approach of making photo-curing catalyst's existence-ization cure this constituent fast at low temperature, observing the fracture surface mol follow G of the hardened material with an electron microscope, and measuring distributed rubber particle diameter is 0.05 micrometers obtained the epoxy resin constituent (a) distributed to homogeneity. In addition, the fine bridge formation mold acrylic rubber particle (S1) content computed from a monomer charge and a residual monomer was proved that it is 37.9 % of the weight.

[0074] Moreover, the softening temperature temperature of the fine bridge formation mold acrylic rubber particle (S1) which covered over which and asked TBA for the epoxy resin constituent (a) showed -42 degrees C.

[0075] (Synthetic example 2) While preparing the 2000ml 4 opening flask equipped with the synthetic agitator of the rubbery polymer particle (bridge formation mold silicone rubber particle; S2) content epoxy resin constituent (b) of a silicon system, gas installation tubing, the thermometer, and the cooling pipe, adding 600g [of bisphenol female mold epoxy resins] (Epiclon 830S and Dainippon Ink & Chemicals, Inc. make), 12g [of acrylic acids], and dimethylethanolamine 1g, and toluene 50g as an epoxy resin of two functionality and introducing air It was made to react at 110 degrees C for 5 hours, and the double bond was introduced. Next, added hydroxy acrylate 5g, butyl acrylate 10g, and azobisisobutyronitril 1g, and it was made to react at 70 degrees C for 3 hours, and was made to react at 90 more degrees C for 1 hour. Subsequently, detoluene was performed under reduced pressure of 110 degrees C. Next, 70g [of silicon intermediate products which have a methoxy group], and dibutyltin dilaurate 0.3g was added into the molecule, the reaction was performed at 150 degrees C for 1 hour, and in order to remove a generation methanol, the reaction was continued for further 1 hour. S2 content epoxy resin constituent (b) which added 300g of things which mixed room-temperature-setting mold 2 liquid type silicone rubber by 1/1 to this graft object, and was made to react to it for 2 hours, and the bridge formation mold silicone rubber particle distributed to homogeneity was obtained.

[0076] The mean-particle-diameter value acquired by the approach of making photo-curing catalyst's existence-ization cure this constituent (b) fast at low temperature, observing the fracture surface mol follow G of the hardened material with an electron microscope, and measuring distributed rubber particle diameter has a 1.5-micrometer distinct bridge formation mold silicone rubber particle (S2) in the epoxy resin constituent (b) distributed to homogeneity. Moreover, the fine bridge formation mold silicone rubber particle (S2) content computed from a charge is 30.0%. Moreover, the softening temperature temperature of the fine bridge formation mold silicone rubber particle (S2) which covered over which and asked TBA for the epoxy resin constituent (b) showed -65 degrees C.

[0077] In the liquid which dissolved the 90 sections of the novolak epoxy resin "EPO TOTO YDCN" which is a solid-state epoxy resin in the 15 sections of t-BPMG and the 15 sections of propylene glycol monoethyl ether acetate which are liquefied epoxy resins, (Example 1) Further The 46 sections of the epoxy resin constituent (a) which the fine bridge formation mold acrylic rubber particle (S1) whose mean particle diameter is 0.05 micrometers distributed to homogeneity, As a latency epoxy curing agent, as the 15 sections of ADH, and a hardening accelerator The three sections of a Fuji resin company product "FUJIKYUA FXR-1030", Until it adds the one section of the non-fixed form silica 2, the ten sections of a non-fixed form alumina, the three sections of the carnauba wax powder whose mean particle diameter is 3micro, and the two sections of silane coupling agent KBM403, it carries out preliminary mixing by the Dalton mixer and then a solid-state raw material is set to 5 micrometers or less with 3 rolls It kneaded, vacuum degassing processing of the kneading object was carried out, and the sealant for liquid crystal display cels (E1) was obtained. The sealant for liquid crystal display cels (E1) consists of an epoxy resin which has the epoxy group of 2.55 weighted means in a monad, and a silane coupling agent content consists [a rubbery polymer particle content / a minerals bulking agent content] of 7.5% of latency epoxy curing agent contents, 1.5% of hardening-accelerator contents, 1.5% of wax contents, and 7.5% of solvents 1% 5.5% 8.7% 66.8% as the content. In addition, 25-degree-C initial viscosity by E mold viscometer was about 60Paands. The storage stability test result of the sealant for liquid crystal display cels (E1), the workability test result with **, and the moisture-vapor-transmission property result were shown in Table 1. To the 100 sections of the sealant for liquid crystal display cels (E1), the five sections of a glass staple fiber (5-micrometer size) spacer are blended, and it mixes enough. The pattern which becomes the glass substrate for liquid crystal cells (it is only called an ITO substrate in the following publications) by which the orientation membrane process was first carried out to the transparent electrode in the obtained constituent from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO substrate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Then, with 80-degree-C air forced oven, after 8-minute processing, another ITO substrate which should become a pair was put, and after alignment, the junction seal trial by the combination of the temporary adhesion process by vacuum sheet press heating for 150 degrees C / [-980hPa and] 5 minutes, and the 150 degrees C / 90-minute heating book hardening process under a no-load was repeated 10 times, and was carried out. Consequently, there is no turbulence of one sample of the seal fault by generating of a seal penetration bubble or a seal line, and the desired cel substrate for liquid crystal displays was able to manufacture it with all lots. Subsequently, after cutting separately, wedge ****** of a cel carried out each cel, and wedge ****** of the cel after a test result, and 120 degrees C / 3-hour pressure cooker trial carried out it, it combined the test result and also the obtained observation result of the liquid crystal display function of a cel, and indicated it to Table 1. The

result of the seal functional durability test performed using the obtained cel was shown in Table -1.
[0078] (Example 2) In the example 1, it changed to the 90 sections of the KURESORU novolak epoxy resin "EPO TOTO YDCN" which is a solid epoxy resin, and the sealant for liquid crystal display cels (E2) was similarly obtained except having considered as the 90 sections of the Mitsui Chemicals, Inc. product "EPO MIKKU VG 3101" which is a kind of a TORIFE Norian ethane mold epoxy resin. The sealant for liquid crystal display cels (E2) consists of an epoxy resin which has the epoxy group of 2.55 weighted means in a monad, as the content, 66.7%, a minerals bulking agent content consists [a rubbery polymer particle content], and a silane coupling agent content consists [a solvent] of 7.5% of latency epoxy curing agent contents, 1.5% of contents of a hardening accelerator, and 1.5% of wax contents 1% 7.5% 5.5% 8.7%. In addition, 25-degree-C initial viscosity by E mold viscometer was 45 Pa-s. The storage stability test result of the sealant for liquid crystal display cels (E2), the workability test result with **, and the moisture-vapor-transmission property result were shown in Table 1. To the 100 sections of the sealant for liquid crystal display cels (E2), the three sections of a spherical silica spacer with a particle diameter of 5 micrometers are blended, and it mixes enough. The pattern which becomes the glass substrate for liquid crystal cells (it is only called an ITO substrate in the following publications) by which the orientation membrane process was first carried out to the transparent electrode in the obtained constituent from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO substrate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Then, with 80-degree-C air forced oven, after 15-minute processing, another ITO substrate which should become a pair was put, and after alignment, the junction seal trial by the combination of the temporary adhesion process by rigid-body sheet press heating for maximum press ** 0.05 MPa/cm2,150 degree C / 5 minutes, and the 150 degrees C / 90-minute heating book hardening process under a no-load was repeated 10 times, and was carried out. Consequently, there is no poor seal of one sample by generating of a seal penetration bubble, and the desired cel substrate for liquid crystal displays was able to manufacture it with all lots. Subsequently, wedge ****** of the cel after cutting separately carried out each cel, and wedge ****** of the cel after a test result, and 120 degrees C / 3-hour pressure cooker trial carried out it, it observed the existence of the seal penetration fault of a test result and the obtained cel, and the linearity of a seal line with the magnifier, and those results and the result of the seal functional durability test performed using the obtained cel were shown in Table -1.
[0079] (Example 3) It is the 30 sections of Epicoat EP-1004, and the 40 sections of the oil-ized shell company product "Epicoat TMH574" which is a tris phenol methane mold epoxy resin as a solvent of non-reactivity [beforehand]. It dissolves in the 30 sections of the partially aromatic solvent which consists of a weight ratio 1:1 of butyl cellosolve and ethylcellosolve. In the liquid, as an amino epoxy resin, the six sections of "EPO TOTO YH-434", The ten sections of Epiclon 830S which are a bisphenol female mold epoxy resin, The 42 sections of the epoxy resin constituent (b) which the fine bridge formation mold silicone rubber particle (S2) whose mean particle diameter is 1.5 micrometers distributed to homogeneity, As a latency epoxy curing agent, the 14 sections of isophthalic acid JIHIDORAJIDDO, As a hardening accelerator, the N-cyano ethyl-2-ethyl-4-methylimidazole 6 section, The three sections of titanium oxide "CR-EL", the 12.4 sections of a graft-ized denaturation alumina, The five sections of a push wax are added. the 1.6 sections of KBM403, and 110 degrees C of softening temperatures — pulverized coal-like Fischer — fatty tuna — Preliminary mixing was carried out by the Dalton mixer, it kneaded until the solid-state raw material was set to 5 micrometers or less with 3 rolls next, and vacuum degassing processing of the kneading object was carried out, and the sealant for liquid crystal display cels (E3) was obtained. The sealant for liquid crystal display cels (E3) consists of an epoxy resin which has the epoxy group of 2.46 weighted means in a monad, and a silane coupling agent content consists [a rubbery polymer particle content / a minerals bulking agent content] of 7% of latency epoxy curing agent contents, 3% of accelerator contents, 15% of solvent contents, and 2.5% of wax contents 0.8% 7.7% 6.3% 57.3% as the content. In addition, 25-degree-C initial viscosity by E mold viscometer was about 60Paands. The storage stability test result of the sealant for liquid crystal display cels (E3), the workability test result with **, and the moisture-vapor-transmission property result were shown in Table 1. To the 100 sections of the sealant for liquid crystal display cels (E3), the three sections of a spherical silica spacer with a particle diameter of 5 micrometers were blended, the pattern which becomes the ITO substrate by which the orientation membrane process was first carried out to the transparent electrode in the constituent which mixed enough and was obtained from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO substrate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Then, it dried with 90-degree-C air forced oven for 20 minutes, and another ITO substrate which should become a pair was put, and after alignment, the junction seal trial by the combination of the temporary adhesion process by rigid-body sheet press heating for press ** 0.05 MPa/cm2,150 degree C / 5 minutes, and the 160 degrees C / 60-minute heating book hardening process under a no-load was repeated 10 times, and was carried out. Consequently, there is no poor seal of one sample by generating of a seal penetration bubble, and the desired cel substrate for liquid crystal displays was able to manufacture it with all lots. Subsequently, wedge ****** of the cel after cutting separately carried out each cel, and wedge ****** of the cel after a test result, and 120 degrees C / 3-hour pressure cooker trial carried out it, it observed the existence of the seal penetration fault of a test result and the obtained cel, and the linearity of a seal line with the magnifier, and the result of the seal functional durability test performed using those results and obtained cels was shown in Table -1.
[0080] (Example 4) an example 3 — setting — Fischer — fatty tuna — it changed to the five sections of a push wax, and the sealant for liquid crystal display cels (E4) was completely similarly prepared except having considered as the five sections of the oxidation micro crystallin wax whose melting point is 85 degrees C. The storage stability

test result, the workability test result with **, and moisture-vapor-transmission property result of the sealant for liquid crystal display cels (E4) were shown in Table 1. To the 100 sections of the sealant for liquid crystal display cels (E4), the three sections of a 5-micrometer spherical silica spacer were blended, the pattern which becomes the ITO substrate by which the orientation membrane process was first carried out to the transparent electrode in the constituent which mixed enough and was obtained from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO substrate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Then, another ITO substrate which should become a pair after 15-minute heat treatment was put with 95-degree-C air forced oven, and after alignment, the junction seal trial by the combination of the temporary adhesion process by rigid-body sheet press heating for press ** 0.05 MPa/cm2,180 degree C / 3 minutes, and the 150 degrees C / 80-minute heating book hardening process under a no-load was repeated 10 times, and was carried out. Consequently, there is no poor seal of one sample by generating of a seal penetration bubble, and the desired cel substrate for liquid crystal displays was able to manufacture it with all lots. Subsequently, wedge ****** of the cel after cutting separately carried out each cel, and wedge ****** of the cel after a test result, and 120 degrees C / 3-hour pressure cooker trial carried out it, it observed the existence of the seal penetration fault of a test result and the obtained cel, and the linearity of a seal line with the magnifier, and the result of the seal functional durability test performed using those results and obtained cels was shown in Table -1.

[0081] (Example 5) It is a solid-state-like cresol novolak epoxy resin at 0-50 degrees C. In the liquid which dissolved the 70 sections of "EPO TOTO YDCN-703" in the 20 sections of the Sumitomo Chemical Co., Ltd. product "SUMIKA epoxy ELM-100" and the 16 sections of a diethylene-glycol monomethyl ether (alias name methyl carbitol) solvent which are liquefied amino epoxy resins Furthermore, the 49 sections of a rubbery polymer particle content epoxy resin constituent (a), As a latency epoxy curing agent, the eight sections of ADH, the six sections of AD2, the two sections of an adipic acid, The 23 sections of a graft-ized denaturation alumina, the one section of silane coupling agent KBM403, said -- Y-9030 -- the 3 sections, impalpable powder-like the carnauba wax 2 section was added further, and preliminary mixing was carried out by the Dalton mixer, it kneaded until the solid-state raw material was set to 5 micrometers or less with 3 rolls next, and vacuum degassing processing of the kneading object was carried out, and the sealant for liquid crystal display cels (E5) was obtained. The sealant for liquid crystal display cels (E5) consists of an epoxy resin which has the epoxy group of 2.9 weighted means in a monad, and consists of 1% of adipic-acid contents and 1% of wax contents 8% and whose silane coupling agent content 11.5% and a solvent content are [a rubbery polymer particle content] 2%, 7% of latency epoxy curing agent contents, and a hardening accelerator for 9.3% and a minerals bulking agent content 60.2% as the content. In addition, 25-degree-C initial viscosity by E mold viscometer was about 60 to 70 Pa-s. The storage stability test result, the workability test result with **, and moisture-vapor-transmission property result of the sealant for liquid crystal display cels (E5) were shown in Table 1. To the 100 sections of the sealant for liquid crystal display cels (E5), the five sections of the glass staple fiber spacer of 5 micrometers of sizes are blended, and it mixes enough. The pattern which becomes the polyethylene terephthalate plastic plate for liquid crystal cells (it is only called an ITO plastic plate in the following publications) by which the orientation membrane process was first carried out to the transparent electrode in the obtained constituent from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO plastic plate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Another ITO plastic plate which should become a pair after 20-minute heat-treatment was put at 85 degrees C after that, and after alignment, the junction seal trial by the multistage heat press heating method for press ** 0.02 MPa/cm2,110 degree C / 180 minutes was repeated 10 times, and was carried out. Consequently, there is no poor seal of one sample by generating of a seal penetration bubble, and the desired cel substrate for liquid crystal displays was able to manufacture it with all lots. Subsequently, after cutting separately, wedge ****** of a cel carried out each cel, and wedge ****** of the cel a test result and 5 hours after 80-degree-C warm water immersion carried out it, it observed the existence of the seal penetration fault of a test result and the obtained cel, and the linearity of a seal line with the magnifier, and indicated those results to Table 1. Furthermore, the result of the seal functional durability test performed using the obtained cel was shown in Table -1.

[0082] (Example 1 of a comparison) In the example 1, the sealant for liquid crystal display cels (F1) was similarly prepared except carnauba wax not being included. The storage stability test result, the workability test result with **, and moisture-vapor-transmission test result of the sealant for liquid crystal display cels (F1) were shown in Table 1. To the 100 sections of the sealant for liquid crystal display cels (F1), the five sections of the glass staple fiber spacer of 5 micrometers of sizes were blended, the pattern which becomes the ITO substrate by which the orientation membrane process was first carried out to the transparent electrode in the constituent which mixed enough and was obtained from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO substrate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Then, another ITO substrate which should become a pair after 20-minute processing with 80-degree-C air forced oven was put, and after alignment, under the temporary adhesion process by vacuum sheet press heating for 150 degrees C / [-980hPa and] 5 minutes, and the no-load in 150 more degree-C heating oven, the junction seal trial which comes to pass this hardening heating adhesion process for 90 minutes was repeated 10 times, and was carried out. Consequently, the turbulence of the seal fault by generating of a seal penetration bubble or a seal line was not generated at all. The result of the seal functional durability test performed using the obtained cel was shown in Table -1.

[0083] (Example 2 of a comparison) an example 3 -- setting -- Fischer -- fatty tuna -- the sealant for liquid crystal

display cels (F2) was similarly prepared except a push wax not being included. The storage stability test result, the workability test result with **, and moisture-vapor-transmission test result of the sealant for liquid crystal display cels (F2) were shown in Table 1. To the 100 sections of the sealant for liquid crystal display cels (F2), the five sections of the glass staple fiber spacer of 5 micrometers of sizes were blended, the pattern which becomes the ITO substrate by which the orientation membrane process was first carried out to the transparent electrode in the constituent which mixed enough and was obtained from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO substrate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Then, another ITO substrate which should become a pair after 20-minute processing with 80-degree-C air forced oven was put, and after alignment, after passing through the temporary adhesion process by rigid-body sheet press heating for press ** 0.03 MPa/cm2,180 degree C / 3 minutes, it put in into 150-degree-C heating oven succeedingly, and under the no-load, the junction seal trial which comes to pass this hardening adhesion process for 90 minutes was repeated 10 times, and was carried out. Consequently, the turbulence of the seal fault by generating of a seal penetration bubble or a seal line was not generated at all. The result of the seal functional durability test performed using the obtained cel was shown in Table -1.

[0084] (Example 3 of a comparison) In the example 1, except having changed the addition loadings of carnauba wax to the three sections (1.5%), and having considered as the 33 sections (15%), the constituent 217 same section was completely obtained and it considered as the sealant for comparison liquid crystal display cels (F3). Although a wax content consists of 15%, the glass base for LCD was made to harden the sealant for liquid crystal display cels (F3) in 150-degree-C heating oven after 15-minute precure at 80 degrees C after 50micro spreading for 90 minutes. When it took out after that and Scotch tape exfoliation was carried out, the exfoliation phenomenon from a glass interface was observed easily. Furthermore, the place and hardening paint film which were applied to 120-degree-C pressure cooker trial for 10 minutes had exfoliated altogether from the glass base, and since it became clear that adhesion dependability was remarkably missing, the storage stability trial in connection with the sealant for liquid crystal display cels, a spreading workability trial, a moisture-vapor-transmission characteristic test, and the seal functional durability test by the cel were not presented with them.

[0085] (Example 6) The sealant for liquid crystal display cels (E6) was completely similarly prepared except having changed to the two sections of carnauba wax in the example (5), and having considered as the two sections of the Oriental PETORO light company product; product name PETORO light E1040 (the melting point of 106 degrees C, oxidization polyethylene wax system wax). The storage stability test result, the workability test result with **, and moisture-vapor-transmission test result of the sealant for liquid crystal display cels (E6) were the same as the result of an example 5 within the experimental error. To the 100 sections of the sealant for liquid crystal display cels (E6), the five sections of the glass staple fiber spacer of 5 micrometers of sizes were blended, the pattern which becomes the ITO substrate by which the orientation membrane process was first carried out to the transparent electrode in the constituent which mixed enough and was obtained from a total of four cels of the 1 inch size four directions each 1 per one substrate was screen-stenciled, and the ITO substrate which consists of **** of 0.5mm and thickness of about 20-22 micrometers was obtained. Then, another ITO substrate which should become a pair after 20-minute processing with 80-degree-C air forced oven was put, and after alignment, the junction seal trial by the heat press heating method for press ** 0.03 MPa/cm2,150 degree C / 90 minutes was repeated 10 times, and was carried out. Consequently, the turbulence of the seal fault by generating of a seal penetration bubble or a seal line was not generated at all. The result of the seal functional durability test performed using the obtained cel was as good as O after 1000 hours.

[0086]

[Table 1]

表１

例番号 項目	実施例１	実施例２	実施例３	実施例４	実施例５	比較例１	比較例２	比較例３
液晶表示セル用ｼｰﾙ材	Ｅ１	Ｅ２	Ｅ３	Ｅ４	Ｅ５	Ｆ１	Ｆ２	Ｆ３
貯蔵安定性試験結果	○	○	○	○	○	○	○	○
塗付作業性試験結果	○	○	○	○	○	○	○	○
接合シール試験結果 ｼｰﾙﾗｲﾝの乱れ有無 貫通孔の有無	 なし なし	 なし なし	 なし なし	 なし なし	 なし なし	 なし なし	 なし なし	剥離 あり あり
透湿度特性試験結果	○	○	○	○	○	×	×	
ｾﾙの耐熱ｸｻﾋﾞ引剥し試験結果	◎	◎	◎	◎	◎	◎	◎	
ﾌﾟﾚｯｼｬｰｸｯｶｰ試験後のｾﾙのｸｻﾋﾞ開き試験結果	○	◎	◎	◎	◎	◎	◎	
ｾﾙの非滲み出し性試験結果	○	○	○	○	○	○	○	
ｼｰﾙ機能耐久性試験結果 ２５０時間経過後 ５００時間経過後 １０００時間経過後	 ◎ ◎ ○	 ◎ ◎ ○	 ◎ ◎ ◎	 ◎ ◎ ◎	 ◎ ◎ ◎	 ○ × ×	 ○ × ×	

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] the sealant for liquid crystal display cels of this invention -- 1 liquid type -- I . storage stability and spreading workability -- good -- the temporary adhesive property after RO . precure -- high -- Ha . -- especially -- a sheet press heating adhesion method -- non-blot ******, the linearity of a seal line, and an exact gap width-of-face controllability -- excelling -- NI. -- the hardening object is excellent in low moisture permeability in a pyrosphere from a room temperature, and excellent in the adhesion endurance at the time of a HO . elevated temperature. It is clear that the liquid crystal display cel's obtained the prolonged display stability under a heat-and-high-humidity environment is securable. 60-degree-C moisture vapor transmission of the hardening object of the sealant for liquid crystal display cels itself exceeds 500 hours by the result of seal functional durability test by having the low moisture permeability functional film physical properties of less than 2-24 hrs(es) of 30 g/m, and the liquid crystal display functional result of 1000 more hours after of especially the liquid crystal display component manufactured at the sealant for liquid crystal display cels of the invention in this application so that clearly [in an example 1 - an example 5] is also fitness (O). The operation effectiveness that the liquid crystal display endurance function under a heat-and-high-humidity environment is held is clear. On the other hand, the difficult thing of stable maintenance of the display function which exceeded 500 hours by the result of seal functional durability test is clear, and the life of a liquid crystal display component has finished it with the liquid crystal display component with which 60-degree-C moisture vapor transmission of the sealant hardening film physical properties for liquid crystal display cels was manufactured using the constituent exceeding 30 g/m2 and 24hrs as the example 1 of a comparison, or the example 2 of a comparison ephemerally as a result. That is, that the long duration display stability under a heat-and-high-humidity environment is securable can say as the description the liquid crystal display cel manufactured using the sealant constituent for liquid crystal display cels of the invention in this application. It was able to use for the facility used in heat-and-high-humidity situations, such as a car, with the liquid crystal display component of the invention in this application.

[Translation done.]